

## TITLE OF THE INVENTION

### RETRACTABLE COVER WITH BIASING MECHANISM FOR COVERING STRUCTURES

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## BACKGROUND OF THE INVENTION

### 1. FIELD OF THE INVENTION

[0001] This invention relates to a retractable cover with biasing mechanism for covering structures.

[0002] In particular, it relates to a retractable cover that includes a flexible  
10 material portion and at least one biasing means enabling the cover to automatically retract from an extended state and thus allows the flexible material to be rolled up. The retractable cover is particularly applicable to tents or temporary structures, but could also be applied to window covers, awnings, truck sidings, trailer covers, boat canopies, or the like. However, the present invention may also have other applications outside this field.

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### 2. DESCRIPTION OF THE RELATED ART

[0003] The general method of covering an opening, enclosure or outdoor area is generally by a window, door, or a covering of some description.

[0004] The term "door" or "window" usually refers to a solid structure in a house  
20 or the like which can be transparent, translucent or opaque. In the case of a more temporary or flexible structure with an entrance opening, the need for a flexible cover that does the same job as a door or window becomes necessary.

[0005] A cover can be something used to protect an underlying surface, enclose an opening, or provide a shield, a wall, or a limitation.

- [0006] In the example of a tent, a cover can include the "roll down" or zipper-type of cover that is positioned over a window or door to block out the elements, keep out insects, block light, or provide privacy.
- 5 [0007] In the example of a transport truck or the like, a cover can be the side flap on the trailer that covers stored goods for transport. For a trailer or utility truck deck, the cover can be a typical trailer cover or truck deck cover that covers articles in the trailer or truck deck.
- [0008] In the example of a caravan, stall or shop, a cover can be the temporary roof that provides shelter from the sun or the elements to protect the underlying items.
- 10 [0009] In the example of a boat, a cover can be an awning or temporary roof that also provides shelter from the sun or the elements to protect the underlying persons or items.
- [0010] In many situations where there are varyingly sized receptacles, containers and the like that require a temporary or permanent cover means, the cover can provide the
- 15 ability to close off the receptacle or container from access, from the weather elements, and so forth.
- [0011] In all cases where a cover is required, the means of storing the cover when not in use, the application of that cover when required, and the process of manipulating the same cover for either or both use and storage, can be both tedious and time
- 20 consuming.

- [0012] When a person is camping in a tent or residing in a caravan awning, securing or storing the window or door covers is a tedious process. In poor weather situations, the time taken to put a cover in place can lead to the person getting cold or wet.
- 5 [0013] In a freight-trucking situation, folding back a cover to expose goods for transfer can take time and restrict access to goods while unloading. Any time saved while undertaking a job allows the user to be more economical and provides the possibility of fitting more activities into a day, providing potential for higher earnings.
- [0014] In the case of a stall, caravan or shop, the ease of application and removal  
10 of a cover allows attendants more time on other jobs, increasing efficiency.
- [0015] Current inventions address the problems of storage of the covers by means of enclosures, or the like. They also address the problem of quick extension and retraction of covers, but in all cases the procedures require either complex mechanisms, or a series of support systems. None of the current inventions provide for a quickly  
15 retracting cover that is simple, compact, and in the case of a tent or awning, can be incorporated into the design of the tent or awning without substantially limiting the packing size.
- [0016] A built-in awning for a recreational vehicle is described in WO 93/09005. A longitudinal reel is included within a recess in a side wall of the recreational vehicle.  
20 The reel is adapted to carry a length of awning material, and there are provided means for rotating the reel in order to wrap and unwrap the awning material on/from the reel. To rotate the reel the rotating means are manually operated, or effected by the operation of an electric motor means.

[0017] Another version of a retractable cover is described in U.S. Patent Number 6,053,556 which relates to a retractable cover for truck beds. The cover comprises a rectangular shaped flexible web having a front end fixed to the shell of a spring powered roller. The roller is fixed by brackets to either side of the truck bed. A pull strap allows  
5 retraction and extension of the cover by an operator from the back of the truck.

[0018] United Kingdom Patent Application Number 217,375A also describes a similar motor vehicle and trailer protection which comprises at least one flexible sheet material, provided in rolled form and stored in a holder. Before the flexible cover is unrolled from the holder, the holder is secured to the vehicle or trailer via brackets which  
10 co-operate with and/or are secured in place by the closed boot lid, a closed rear window of a hatchback car, or a car bumper. The holder, in the form of an elongate box or cylinder, includes a longitudinal slot through which the cover is fed. A spring-loaded roller is included in the holder, to which one end of the flexible cover is attached. The cover includes stops at its opposite end to prevent the cover being fully retracted into the  
15 holder by the operation of the spring-loaded roller when tension of the extended cover is released and the cover is to be retracted. The roller is spring-loaded so as to always urge the cover to be rolled up on the roller.

[0019] All of the above systems rely on the use of a roller around which the unwrapped material cover is rolled. After use, the roller may be rotated by spring  
20 mechanisms, electric motor means, or manual rotation systems to roll the cover up. Such systems may be bulky, include a number of parts which may become damaged, or worn and require replacement, and do not allow for different extensions of one elongate side edge of the material compared to the other such that the cover may lie partially unwound

in a substantially diagonal arrangement across the opening or structure, to enable the opening or structure to be only partially covered, if required. Further, for some of these systems, the holder is a cumbersome object which is required to be fitted to the structure, requires storage when not in use and is not compact. Further, the damage to the helical  
5 spring or winding mechanisms, or weakening thereof, may result in no, or imperfect, retraction of the cover into the holder.

**[0020]** A different means of effecting a flexible retractable door is described in U.S. Patent Number 5,332,021. This invention uses sheet polyester film, for example, composed of commercially available "MYLAR", which has a permanent memory, is set  
10 to roll up on itself, or otherwise to retract automatically into a coil. The memory of the material minimizes the need to include separate winding apparatus. The material is not substantially flexible as may be canvas, thinner plastics materials, rubber and so forth. It is the rigidity of the material that permits it to retain its coil memory and allows the door to operate as it is described in the patent.

15 **[0021]** Such material however would not be suitable as covers for tent doorways or windows, or for vehicle trailers, or as awnings where there is a need for greater flexibility of material, a need to roll up the covers to be substantially compact, and so forth. Further, the potential coiling tension of the polyester sheet as a whole may limit the use of this material in situations where it would be useful to extend only one elongate  
20 side edge of the material in a manner which creates a substantially diagonal arrangement across the opening or structure, to enable the opening or structure to be only partially covered, if required, such as is often the case for a tent doorway, tent window covers, or

the sides of awnings. Further, in its various applications, it includes a means to contain or retain the coiled material.

**[0022]** Therefore, these above mentioned examples and other available devices do not address the problems which the present invention seeks to address.

5 **[0023]** While the present invention has a number of potentially realizable applications, it is in relation to problems associated with such existing systems that the present invention was developed. More specifically, it was with the problems associated with the lack of a readily available alternative system for achieving a cover capable of being quickly extended or retracted without the need for cumbersome systems such as  
10 rollers, or holders; therefore, a cover which may be made of a range of flexible materials as applied to tents, awnings, boat covers, trailer or truck deck covers, and so forth.

**[0024]** In addition, having a simple system capable of being easily installed would benefit those with pre-existing covers on their tents, or with awnings or covers used for recreational vehicles, trailer or trucks, or shop frontages. It would further benefit  
15 those wishing to install such a system as part of a new design.

**[0025]** It would be useful therefore to have a system that:

**[0026]** could have the benefits of being fitted to existing material covers as required; yet

**[0027]** could be accommodated into new covers; and

20 **[0028]** could be permanently or temporarily installed; and

**[0029]** could be less bulky than previous systems; and

**[0030]** could enable the cover to be partially or fully extended, even to create a diagonal opening; and yet

[0031] could be used with covers of various shapes, sizes and weights;  
and

[0032] did not require complex mechanisms, or means that included  
multiple parts, to wrap up or unwrap the cover.

5 [0033] It would therefore be advantageous to have an invention that offered at  
least some if not all of the advantages of the above proposed retractable cover.

#### BRIEF SUMMARY OF THE INVENTION

[0034] It is therefore an object of the present invention to consider the above  
10 problems and provide at least one solution which addresses a plurality of these problems.

[0035] It is also an object of the present invention to provide a system which  
allows for a substantially trouble free installation.

[0036] Ideally the system is suitable for use, or is suitable to being adapted for  
use, in situations where existing or new covers are used or are to be used, as well as  
15 providing a range of other possible locations for use not previously considered to be  
practical.

[0037] It is also a further object of the present invention to provide a retractable  
cover that can be operated by a single operator in a variety of applications.

[0038] Finally, it is an object of the present invention to at least provide the  
20 public with a useful choice or alternative system.

[0039] All references, including any patents or patent applications cited in this  
specification, are hereby incorporated by reference only. This reference does not  
constitute an admission that any of these documents form part of the common general

knowledge in the art, in New Zealand or in any other country. The discussion of the references states what their authors assert, and the applicant reserves the right to challenge the accuracy and relevance of the cited documents.

5 [0040] It is acknowledged that the term "comprise" may, under varying jurisdictions, be attributed with either an exclusive meaning or an inclusive meaning. For the purpose of this specification, and unless otherwise noted, the term "comprise" shall have an inclusive meaning; that is, that it will be taken to mean an inclusion of not only the listed components it directly references, but also other non-specified components or elements. This rationale will also be used when the term "comprised" or "comprising" is  
10 used in relation to one or more steps in a method or process.

[0041] Further aspects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only. It should be appreciated that variations to the described embodiments are possible and would fall within the scope of the present invention.

15 [0042] According to one aspect of the present invention, there is provided a retractable cover which includes a flexible material portion characterized in that the flexible material includes at least one biasing means.

[0043] The biasing means is further characterized in that it is self-retracting. Accordingly, the biasing means itself has a permanent, or substantially permanent, coil  
20 memory to enable it to roll up on itself when released from an extended orientation.



**[0044]** The biasing means effects retraction of the flexible material portion from an extended orientation to a retracted, rolled orientation. The location of the biasing means on, or in relation to the extendable length of, the flexible material portion is determined by the preferred direction of retraction of the flexible material portion.

5 **[0045]** In prior art systems previously described, the biasing means is attached at least in part to a roller, often located within a holder and not to the substantially extended length of the flexible material itself. Thus when the covers of such prior art systems are retracted the cover is fully wrapped on the roll. In such systems as that described in U.S. Patent Number 6,053,556 and United Kingdom Patent Application Number 217,375A,  
10 and also in U.S. Patent Number 5,332,021, the biasing means includes a helical spring connected at one end to a roll. The spring in the roll provides the retracting force when the cover is extended. WO 93/09005 describes a motor operated, or a manually operated, rewinding option.

**[0046]** The system as described in U.S. Patent Number 5,332,021 relies on the  
15 coiled memory of the material from which the actual cover itself is made.

**[0047]** By comparison, in the present invention, it is the biasing means that extends along all or a substantial portion of the extended length of the flexible material that provides the retracting force when the flexible material is extended. This provides some advantages over the prior art in that a separate roller is not required; the biasing  
20 means may be used to provide the desired retraction of all or even only a portion of the flexible material; and cumbersome additional features such as storage boxes, holders, or containers are not required to house the spring and roller mechanism, or the self-coiling substantially rigid cover material when coiled. Rather, one end of a range of flexible

materials, with the biasing means in place, may be directly attached to a portion of the structure substantially in the vicinity of the area or the structure required to be covered.

The cover with included biasing means is not bulky. The means of attachment of the cover including the biasing means may be a permanent or temporary arrangement. The

5 inclusion of the biasing means with the actual flexible material may also be permanent or temporary.

[0048] With existing covers on boats, tents, houses and buildings, the existing systems typically offer simply an up or down option. There is typically provided no maintainable mid-way or angled position for the flap or cover. The height of the cover is  
10 unable to be controlled means that the user is therefore unable to control the light, air, or weather from entering, for example, a doorway or window of a tent. It is also generally a tedious affair having to roll up covers of boats, tents, trucks, and awnings. Further, rolling by hand is perhaps the single most factor that destroys the quality of clear covers through scratching, cracking, marking and fingerprints, and so forth.

15 [0049] The term "biasing means" in accordance with the present invention should be understood to include a means that causes the flexible material to move from an extended state to a compact or retracted position. This, for example, could include a strip which is under toroidal tension when in an extended state, e.g., elastic rubber or a tensioned metal strip such as a spring or a constant force spring. However, these are  
20 listed by way of example only and should not be seen to be limiting in any way.

[0050] In some embodiments, the biasing means is a constant force spring.

[0051] In preferred embodiments, the spring is a varied force spring, so designed that when in an extended state, the spring will begin to retract with a lesser degree of

force compared to when it is in a partially retracted state. As the spring retracts further, it will do so with greater force. This is an advantage when affixed to a flexible material, as the weight of material to be moved into a compact or retracted state, when in a fully extended state, is less than when the spring is partially retracted. When partially retracted, there is a greater weight of material to retract, so the increased strength of the spring allows the retraction to continue unaided and substantially unimpeded.

**[0052]** Varied force springs can include commercially available "ELGILOY"-based springs and commercially available "INCONEL"-based springs. "INCONEL"-based springs are high performance nickel alloy based springs that are corrosion resistant. "ELGILOY"-based springs are cobalt/chromium/nickel rich alloy springs with excellent fatigue life, with corrosion resistance in numerous environments, and are non-magnetic.

**[0053]** This biasing means allows the cover that it is incorporated into to automatically retract on release of the cover from its extended state.

**[0054]** The term "flexible material" in accordance with the present invention includes materials such as fabric, canvas, plastic, mesh, nylon, rubber or any material that is substantially flexible and may be used with the present invention.

**[0055]** The flexible material portion is characterized by the location of the biasing means on, or in relation to at least a substantial portion of, the overall extendable length of the flexible material portion. Further, this arrangement of the biasing means, relative to the actual flexible material itself, lends an added feature to the present invention in that the flexible material may take other than a rectangular shape. For example, the retractable cover may be circular, triangular, and so forth. The shape need not be impeded by the dimensions or requirements of a spring loaded roller, or of a holder for

containing the retracted cover. The ability to select a preferred flexible material from a range of suitable options, from canvas, to webbing, to rubber, to plastic material sheeting, of various thickness, and so forth enables the present invention to provide a degree of choice that may be more restrictive in previous systems.

5    **[0056]**       The use of such biasing means in association with a range of flexible materials as assembled in accordance with the present invention as herein described, or as may be adapted to include, provides an improved alternative for the existing cover systems as discussed in examples described herein. Covers of different materials and weights may be accommodated by determination of the required coil spring energy  
10 characteristics of the biasing means.

**[0057]**       Further, the present invention allows for retraction of one side length of the cover, but not the other, to create a partial opening as may be required in particular circumstances, such as entry and exit to a tent, partial closure of a window opening, access to only a portion of a trailer or truck deck, and so forth. Prior art systems referred  
15 to do not provide for such flexibility of operation.

**[0058]**       In preferred embodiments, the retractable cover is used to cover surfaces. The surface could include an opening, area, or enclosure, as part of a structure. For example, as already referenced, the structure with which the retractable cover may be used may include tents as a cover for windows and doors, awnings for attachment to  
20 tents, recreational vehicles, or buildings, covers for trailers or truck decks, the flexible side walls of larger transport trucks and the like. However, these are listed by way of example only and should not be seen to limit the scope of this invention in any way.

[0059] The term "opening" in accordance with the present invention should be understood to include a door, a window, or a cat flap or the like, but these are also listed by way of example only and should not be seen to be limiting in any way.

[0060] The term "area" in accordance with the present invention should be understood to include a surface such as a wall, floor or the like, where a picture, drawing or feature is to be covered; however, these are also listed by way of example only and should not be seen to be limiting in any way.

[0061] The term "enclosure" in accordance with the present invention should be understood to include a tent, caravan awning, house, caravan, truck trailer, stall, shop, fireplace, box or container; however, these are listed by way of example only and should not be seen to be limiting in any way.

[0062] According to another aspect of the present invention, there is provided a method of inclusion of a biasing means, as described above, with an existing cover for covering a structure characterized by the step of incorporating at least one biasing means to an existing cover.

[0063] This has the advantage of allowing an existing covering for a structure to be made into a retractable form by the addition of biasing means. The biasing means could be attached by a bonding glue or be sewn in, or encased in a full or partial sheath that could either then be sewn onto the cover, or be incorporated into the design of the cover initially by folding the cover to form a sheath and sewing down each side of it to secure it in place. Alternatively, the biasing means may be held in place by the inclusion on the cover of multiple tabs, loops or similar retaining means. The biasing means is then included on the cover by threading it under the tabs, through the loops and so forth.

[0064] In some embodiments, where whole and/or partial sheath housings are included, the biasing means could include a zipper, a hook-and-pile system, buttoned or press stud arrangements, or similar, running the length of the sheath portion so that the biasing means could be installed, checked, replaced, or maintained, or to increase the number of biasing means over and above that number originally used in order to increase the overall strength of the bias, or to reinforce the biasing means, if for example, the choice of application of the cover had changed and a stronger biasing means was required.

[0065] It should be appreciated that the term "sheath" in accordance with the present invention should be understood to mean a cover, fitted or temporary, that encases a whole or part of the biasing means. The sheath could be made of fabric, plastic, rubber, or the like. However, the sheath may be made of any suitable material and these are listed by way of example only and should not be seen to be limiting.

[0066] For example, the sheath may cover the entire length of the biasing means. Alternatively, the sheath may be included at each distal end of the biasing means. The sheath may operate to provide protection of the biasing means from corrosion or the like, or to enable the biasing means to be affixed to an existing or new structure, or where the edges of the biasing means may be sharp or have the tension to rip through a flexible cover, the sheath may be end portions on the biasing means to protect the user and/or the flexible material. The end sheaths, partial sheaths and full sheaths may be used in any combination with each other, or singularly.

[0067] According to another aspect of the present invention there is provided securing means for securing a retractable cover as described above to an existing structure.

[0068] According to another aspect of the present invention there is provided a retractable cover including securing means, characterized in that the securing means is adapted to attach the retractable cover to a structure.

[0069] The term "securing device" in accordance with the present invention should be understood to include a means that allows the retractable cover to be attached, in its entirety to an existing structure. This means could include a hook-and-pile fastener, also known as a hook-and-loop fastener, such as commercially available "VELCRO"; buttons; domes; or metal clips. These options are, however, listed by way of example only and should not be seen to be limiting in any way.

[0070] The general operation of the retractable cover will depend on the structure with which it is used. For example, a cover for a window, or enclosure, may preferably be extended and retracted vertically, in an up-down direction; a cover for a door or similar opening may be extended and retracted laterally/sidewise, in a left to right direction; an awning or cafe outdoor seating cover may be extended and retracted horizontally, or at any appropriate angle.

[0071] This embodiment has the advantage of providing a quickly retracting cover that is simple, compact, and in the case of a tent or awning, can be incorporated into the design of the tent or awning without limiting the packing size in any substantial way.

[0072] A number of biasing means can be incorporated into a cover of, for example, a tent window or door, allowing, on release of any securing device, the cover to retract to the top of the window or door, where it can be secured by a hook-and-pile fastener such as commercially available "VELCRO" or the like. This means that for a small cover only a single biasing means might be required, but on a larger door or window cover, a number of biasing means could be incorporated to ensure there is enough strength to cause the cover to retract when the cover is required to be opened or lifted.

[0073] As previously mentioned, it should also be appreciated that several biasing means may be incorporated into a single sheath or the like, to increase the strength of the retracting means, or to reinforce the first spring if the application of the cover has changed or the strength of the spring has decreased over time.

[0074] Given the natural orientation of the biasing means dictates a preference for the cover to urge towards a retracted state, it is necessary in use, when the cover is extended, for there to be included affixing means to ensure the cover is retained in the extended state for a preferred period of time. Affixing means to maintain the cover in an extended orientation may include any or a combination of a hook-and-pile fastener system such as commercially available "VELCRO", buttons, material ties, clips, magnets, zippers, or hooks, but these are examples only and should not be seen as being limiting in any way.

[0075] The affixing means may be located around the structure in locations complementary to and substantially along the whole or part of the structure equating to the length of the cover when extended. Alternatively, the affixing means may be located



only at a position on the structure equating to the fully extended position of the cover.

The number, type and positioning of the affixing means will tend to be determined by any one or a combination of the structure with which the cover is used, the pressures applied to the cover when extended, such as strong winds, the length of the cover when fully  
5 extended, the strength of the biasing means, the material from which the cover is made, and so forth.

**[0076]** Means for enabling a retracted cover to be pulled to an extended state may include a string tied to the ends of the cover, or elastic cords, loops or other means that may be gripped and pulled. Again, the examples provided herein are by way of example  
10 only and should not be seen as being limiting in any way. Any suitable means may be available in the prior art, or may be adapted for use with the present invention.

**[0077]** In a preferred embodiment the retractable cover could be applied to a tent window, whereby the cover is affixed to the tent by means of zippers down each side of the cover. Upon retraction of the zippers to a half way position, the cover would retract  
15 to that position also, allowing for the window to only be half covered, or at any position where the zippers, singularly or together, would be retracted to. This has the advantage of allowing in a limited amount of light or air for circulation, adjustable to personal preferences.

**[0078]** In another preferred embodiment, the retractable cover attached to a tent  
20 window would be accessible from the inside, if the mesh covering the window were attached by a zipper. The mesh zipper could be undone and the window cover accessed and adjusted, then the mesh zipper is done up again. This has the advantage of allowing the window cover to be adjusted without having to step outside.

[0079] Use of the retractable cover in the trucking industry allows for quick retraction of covers, speeding access to goods and ensuring the cover is kept out of the way of loading and unloading. Use of the same cover in outside cafes and stalls and the like to create shelter against the elements allows for quick packing up of a site at closing, and easy storage of the covers when not in use. The ability to attach the same cover to a cafe or stall by a detachable means such as a hook-and-pile fastener also has the advantage of allowing the covers to be brought inside overnight and therefore protected from the elements, theft or vandalism.

[0080] It should be appreciated that the present invention lends itself to more than one application. Hence, the invention may be adapted for use in any location, with a range of building structural features, having a range of dimensions, and/or for use with vehicles and recreational structures, be variable in terms of the strength of the biasing means and the flexible material used, and so forth. As can be appreciated variations to and from the above described embodiments may be made without deviating from the scope of the present invention.

[0081] It should further be appreciated a variety of different embodiments, uses, and applications of the present invention therefore exist, even within the ambit of the above described security box system. An embodiment of the present invention will now be given by way of example only, to help better describe and define the present invention. However, describing the specified embodiment should not be seen as limiting the scope of this invention.

## BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0082] Further aspects of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

5 [0083] Figure 1 is a diagrammatic perspective representation of a retractable cover including biasing means and in a retracted state, in accordance with one embodiment of the present invention;

[0084] Figure 2 is a diagrammatic perspective representation of a retractable cover including biasing means and in an extended state, in accordance with one  
10 embodiment of the present invention;

[0085] Figure 3a is a diagrammatic perspective representation of a tent including a retractable cover over a window opening including biasing means and in a retracted state, in accordance with one embodiment of the present invention; and

[0086] Figure 3b is a diagrammatic perspective representation of tent in which the  
15 retractable cover including biasing means enables the tent to be disassembled in a compact state without the need to detach the covers, in accordance with one embodiment of the present invention.

## DETAILED DESCRIPTION OF THE INVENTION

20 [0087] With reference to the diagrams by way of example only, there is provided a retractable cover 1 with biasing means 5 for covering structures 3.

[0088] The cover 1 as illustrated in Figure 1 is made from substantially flexible materials, such as fabric, canvas, plastic materials, rubber, and so forth. The cover 1 includes a top edge 1a, a bottom edge 1b, and two side edges 1c. The cover 1 is substantially rectangular in shape. However, the shape of the cover 1 is variable between  
5 embodiments and is dictated by the structure's size and shape with which the cover is used.

[0089] The cover 1 may be secured in relation to the structure, at any one or more of the edges of the cover, depending on the function the cover is designed to fulfill. The structure it is covering, in the illustrated example, is an opening 2, such as a window or  
10 doorway of a tent 3, for example. The cover is therefore secured to the surround adjacent the structure. In the illustrated examples, the cover is secured to the top periphery 4, or top edge of the tent window opening 2 it is designed to cover.

[0090] In the illustrated embodiment, the cover 1 is secured in either a permanent or removable manner at its top edge 1a. The actual type of means 4a of securing the  
15 cover 1 to the structure periphery 4a are not illustrated per se, but are represented by simple diagrammatic reference at 4a. The securing means 4a may include being sewn onto the periphery of the structure, affixed by a hook system, by a hook-and-pile system, by a dome or buttoned system, or by screws, pins, adhesives, welding and so forth.

[0091] Figure 1 illustrates an embodiment where the retractable cover 1 is in a  
20 retracted state. Retraction of the cover is effected by the inclusion of biasing means 5. In Figure 1 a set of two biasing means 5a and 5b are included with the cover. The biasing means are located substantially towards both side edges 1c of the cover and extend substantially the full vertical length of the side edges. The strength of the biasing means

and preferred coil memory of the biasing means is designed to effect retraction of the cover from a tensioned extended state to a coiled retracted state, with little effort on the part of the user. This biasing means 5 is selected to allow the cover 1 that it is incorporated into to automatically retract on release of the cover from its extended state.

5 [0092] In addition, the preferred biasing means comprises a varied force spring, so designed that when in an extended state, the spring will begin to retract with a lesser degree of force compared to when it is in a partially retracted state. Thus, as the spring retracts further, it will do so with greater force. This is an advantage when affixed to a flexible material, as the weight of material to be moved into a compact or retracted state  
10 when in a fully extended state, is less than when the spring is partially retracted. When partially retracted, there is a greater weight of material to retract, so the increased strength of the spring allows the retraction to continue unaided and substantially unimpeded.

[0093] The biasing means 5 preferably are composed of stainless steel and may in some instances be modified to suit corrosive environments.

15 [0094] For inclusion of the biasing means to existing structures, the biasing means 5 may be available in predetermined lengths, for example, three meters for use on tents and boats. The biasing means are preferably simple cut to length to suit the particular application using a pair of scissors, or tin snips will suffice.

[0095] The biasing means may have a "force", such as a spring constant or  
20 restorative force, ranging from about 0.25 kg to at least about 50 kg, or equivalent force units such as Newtons. However, it may be preferable to err on the side of weaker rather than stronger and use the biasing means in the cover as an aid rather than a tool, since too strong a biasing means may stress the fabric and associated accessories. Whilst the above

"force" range is preferred for covers for the likes of tents, boats, awnings and truck side walls, other biasing means for various other covers may have a "force" lesser than or greater than the above specified range. Accordingly, the range may vary depending on the flexible material used, the dimensions of the surface required to be covered, and so forth.

[0096] The biasing means may be plain, or encased in a sheath made from PVC, or other suitable materials, or with a thick durable glue lined sheath.

[0097] In Figure 1 the biasing means are directly attached to the cover by restraining means, such as a bonding adhesive, although welding may also be an option.

10 [0098] Affixing means 6, for affixing the cover into position when extended, are also shown. The affixing means may be a hook-and-pile fastener system such as commercially available "VELCRO", buttons, material ties, clips, magnets, zippers, or hooks.

[0099] In the embodiment of Figure 2, the cover 1 is in a fully extended state.

15 The biasing means 5 in this embodiment are encased within a sheath 7 either partially or completely. The sheath is arranged relative to the extendable length of the flexible portion and restrains the biasing means in a predetermined location on the flexible material portion. This figure illustrates a range of possible sheaths. The sheath 7 on the left hand side of the cover is designed to cover the entire biasing means 5. The sheath  
20 may be made from the flexible material and added to the cover, or be included in the cut of the flexible portion such that, when completed, the sheath is integrally formed as part of the cover design. The biasing means on the right hand side of the cover includes only partial sheaths 7 which may operate as end caps for the biasing means, or be loops, tabs

or other spaced apart retaining means. Any option or a combination thereof may be used for the biasing means of various embodiments. Only three options have been illustrated, but other variations of sheath configuration are also possible.

**[0100]** Other means for restraining the biasing means in relation to the flexible material portion include a hook-and-pile system attached both to the flexible material portion and to the biasing means in a complementary manner and attachment apparatus, including screws, bayonet fittings, domes, buttons. However, as can be appreciated, there are numerous equivalents available for use as restraining means, or that may be adapted for use as restraining means.

**[0101]** Means for enabling a retracted cover to be pulled to an extended state may include a string 8 tied to the end of the cover, or elastic cords, loops or other means that may be gripped and pulled.

**[0102]** With reference to Figure 3a there is illustrated one embodiment of use of the present invention. The tent 3 is illustrated with a retractable cover 1 positioned over an opening 2, being either a window or a door. As can be seen from the figure, it is possible to retract the cover partially at 2a to uncover only a portion of the surface of the window 2, or release on one side of the cover to create a diagonal opening 2b with the door 2. This ability to partially retract the whole or part of the cover provides greater flexibility than offered by prior art systems for opening the cover to reveal the structure.

**[0103]** Figure 3b illustrates an envisaged advantage that may be gained not only by the convenience of the automatically retractable cover 1, but also by the ability to disassemble and fold the tent 3 to a compact size 9 without detaching the cover 1. The

retraction mechanism does not provide a substantial limitation to the compactable size of the tent 3.

[0104]           The biasing means 5 by way of example only includes a spring, with particular reference to a varied force spring, but this example should not be seen to be limiting in any way.

[0105]           Similarly, the direction of the retraction of the cover, as represented in Figure 1 is by way of example only and should not be seen as limiting in any way.

[0106]           Also the number and location of the biasing means on the flexible material cover 1, the means of securing the cover adjacent the structure it is to cover, the means of affixing the cover in an extended state for a preferred duration of time, and the means of pulling the retracted cover to its extended state are also all represented by example only and should not be seen to limit variations to the invention.

[0107]           Accordingly, the present invention provides a retractable cover with biasing means that provides:

15   [0108]           a cover for surfaces;

[0109]           a cover that may be both easily and quickly extended and retracted by a single operator over varying sized structures; and

[0110]           a cover which is low in cost, simple to maintain, and easy to install.

20   [0111]           The cover provides for an easy, relatively inexpensive method for rolling up covers whether on a house, tent, boat, building, truck flexible side walls, trailers of utility truck decks, containers or receptacles of varying sizes and shapes.



**[0112]** Again, it should also be understood that the term "comprise" where used herein is not to be considered to be used in a limiting sense. Accordingly, "comprise" does not represent nor define an exclusive set of items, but includes the possibility of other components and items being added to the list.

5 **[0113]** This specification is also based on the understanding of the inventor regarding the prior art. The prior art description should not be regarded as being an authoritative disclosure of the true state of the prior art but rather as referring to considerations in and brought to the mind and attention of the inventor when developing this invention.

10 **[0114]** Aspects of the present invention have been described by way of example only and it should be appreciated that modifications, additions and variations to and from the above described embodiments may be made without deviating from the scope of the present invention as defined in the appended claims.